SEQUENCE LISTING

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<120> POLYPEPTIDES FOR INDUCING A PROTECTIVE
    IMMUNE RESPONSE AGAINST STAPHYLOCOCCUS AUREUS

<130> 21349YP

<140> 10/564,375
<141> 2006-01-12

<150> PCT/US2004/023522
<151> 2004-07-22

<150> 60/489,840
<151> 2003-07-24

<160> 58

<170> FastSEQ for Windows Version 4.0

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Ser Thr Leu Gly Val Ala Ser Val Ile Val Ser Thr Leu Phe Leu Ile
             20                  25                  30
Thr Ser Gln His Gln Ala Gln Ala Ala Glu Asn Thr Asn Thr Ser Asp
         35                  40                  45
Lys Ile Ser Glu Asn Gln Asn Asn Asn Ala Thr Thr Thr Gln Pro Pro
     50          .           55                  60
Lys Asp Thr Asn Gln Thr Gln Pro Ala Thr Gln Pro Ala Asn Thr Ala
65               70                  75                  80
Lys Asn Tyr Pro Ala Ala Asp Glu Ser Leu Lys Asp Ala Ile Lys Asp
             85                  90                  95
Pro Ala Leu Glu Asn Lys Glu His Asp Ile Gly Pro Arg Glu Gln Val
            100                 105                 110
Asn Phe Gln Leu Leu Asp Lys Asn Asn Glu Thr Gln Tyr Tyr His Phe
            115                 120                 125
Phe Ser Ile Lys Asp Pro Ala Asp Val Tyr Tyr Thr Lys Lys Lys Ala
        130                 135                 140
Glu Val Glu Leu Asp Ile Asn Thr Ala Ser Thr Trp Lys Lys Phe Glu
145                 150                 155                 160
Val Tyr Glu Asn Asn Gln Lys Leu Pro Val Arg Leu Val Ser Tyr Ser
                165                 170                 175
```

```
Pro Val Pro Glu Asp His Ala Tyr Ile Arg Phe Pro Val Ser Asp Gly
        180                 185                 190
Thr Gln Glu Leu Lys Ile Val Ser Ser Thr Gln Ile Asp Asp Gly Glu
        195                 200                 205
Glu Thr Asn Tyr Asp Tyr Thr Lys Leu Val Phe Ala Lys Pro Ile Tyr
    210                 215                 220
Asn Asp Pro Ser Leu Val Lys Ser Asp Thr Asn Asp Ala Val Val Thr
225                 230                 235                 240
Asn Asp Gln Ser Ser Ser Val Ala Ser Asn Gln Thr Asn Thr Asn Thr
            245                 250                 255
Ser Asn Gln Asn Thr Ser Thr Ile Asn Asn Ala Asn Asn Gln Pro Gln
        260                 265                 270
Ala Thr Thr Asn Met Ser Gln Pro Ala Gln Pro Lys Ser Ser Thr Asn
        275                 280                 285
Ala Asp Gln Ala Ser Ser Gln Pro Ala His Glu Thr Asn Ser Asn Gly
    290                 295                 300
Asn Thr Asn Asp Lys Thr Asn Glu Ser Ser Asn Gln Ser Asp Val Asn
305                 310                 315                 320
Gln Gln Tyr Pro Pro Ala Asp Glu Ser Leu Gln Asp Ala Ile Lys Asn
            325                 330                 335
Pro Ala Ile Ile Asp Lys Glu His Thr Ala Asp Asn Trp Arg Pro Ile
        340                 345                 350
Asp Phe Gln Met Lys Asn Asp Lys Gly Glu Arg Gln Phe Tyr His Tyr
        355                 360                 365
Ala Ser Thr Val Glu Pro Ala Thr Val Ile Phe Thr Lys Thr Gly Pro
    370                 375                 380
Ile Ile Glu Leu Gly Leu Lys Thr Ala Ser Thr Trp Lys Lys Phe Glu
385                 390                 395                 400
Val Tyr Glu Gly Asp Lys Lys Leu Pro Val Glu Leu Val Ser Tyr Asp
            405                 410                 415
Ser Asp Lys Asp Tyr Ala Tyr Ile Arg Phe Pro Val Ser Asn Gly Thr
        420                 425                 430
Arg Glu Val Lys Ile Val Ser Ser Ile Glu Tyr Gly Glu Asn Ile His
        435                 440                 445
Glu Asp Tyr Asp Tyr Thr Leu Met Val Phe Ala Gln Pro Ile Thr Asn
    450                 455                 460
Asn Pro Asp Asp Tyr Val Asp Glu Glu Thr Tyr Asn Leu Gln Lys Leu
465                 470                 475                 480
Leu Ala Pro Tyr His Lys Ala Lys Thr Leu Glu Arg Gln Val Tyr Glu
            485                 490                 495
Leu Glu Lys Leu Gln Glu Lys Leu Pro Glu Lys Tyr Lys Ala Glu Tyr
        500                 505                 510
Lys Lys Lys Leu Asp Gln Thr Arg Val Glu Leu Ala Asp Gln Val Lys
        515                 520                 525
Ser Ala Val Thr Glu Phe Glu Asn Val Thr Pro Thr Asn Asp Gln Leu
    530                 535                 540
Thr Asp Leu Gln Glu Ala His Phe Val Val Phe Glu Ser Glu Glu Asn
545                 550                 555                 560
Ser Glu Ser Val Met Asp Gly Phe Val Glu His Pro Phe Tyr Thr Ala
            565                 570                 575
Thr Leu Asn Gly Gln Lys Tyr Val Val Met Lys Thr Lys Asp Asp Ser
        580                 585                 590
Tyr Trp Lys Asp Leu Ile Val Glu Gly Lys Arg Val Thr Thr Val Ser
        595                 600                 605
```

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```
Lys Asp Pro Lys Asn Asn Ser Arg Thr Leu Ile Phe Pro Tyr Ile Pro
    610             615             620
Asp Lys Ala Val Tyr Asn Ala Ile Val Lys Val Val Ala Asn Ile
625             630             635             640
Gly Tyr Glu Gly Gln Tyr His Val Arg Ile Ile Asn Gln Asp Ile Asn
            645             650             655
Thr Lys Asp Asp Asp Thr Ser Gln Asn Asn Thr Ser Glu Pro Leu Asn
        660             665             670
Val Gln Thr Gly Gln Glu Gly Lys Val Ala Asp Thr Asp Val Ala Glu
        675             680             685
Asn Ser Ser Thr Ala Thr Asn Pro Lys Asp Ala Ser Asp Lys Ala Asp
    690             695             700
Val Ile Glu Pro Glu Ser Asp Val Val Lys Asp Ala Asp Asn Asn Ile
705             710             715             720
Asp Lys Asp Val Gln His Asp Val Asp His Leu Ser Asp Met Ser Asp
            725             730             735
Asn Asn His Phe Asp Lys Tyr Asp Leu Lys Glu Met Asp Thr Gln Ile
            740             745             750
Ala Lys Asp Thr Asp Arg Asn Val Asp Lys Asp Ala Asp Asn Ser Val
        755             760             765
Gly Met Ser Ser Asn Val Asp Thr Asp Lys Asp Ser Asn Lys Asn Lys
    770             775             780
Asp Lys Val Ile Gln Leu Asn His Ile Ala Asp Lys Asn Asn His Thr
785             790             795             800
Gly Lys Ala Ala Lys Leu Asp Val Val Lys Gln Asn Tyr Asn Asn Thr
            805             810             815
Asp Lys Val Thr Asp Lys Lys Thr Thr Glu His Leu Pro Ser Asp Ile
        820             825             830
His Lys Thr Val Asp Lys Thr Val Lys Thr Lys Glu Lys Ala Gly Thr
        835             840             845
Pro Ser Lys Glu Asn Lys Leu Ser Gln Ser Lys Met Leu Pro Lys Thr
    850             855             860
Gly Glu Thr Thr Ser Ser Gln Ser Trp Trp Gly Leu Tyr Ala Leu Leu
865             870             875             880
Gly Met Leu Ala Leu Phe Ile Pro Lys Phe Arg Lys Glu Ser Lys
            885             890             895
```

<210> 2
<211> 645
<212> PRT
<213> Staphylococcus aureus

<400> 2
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Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1             5             10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu
        20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
```

```
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
            165             170             175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
        180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275             280             285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315             320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
            355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505             510
```

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```
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
                580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645


<210> 3
<211> 649
<212> PRT
<213> Staphylococcus aureus

<400> 3
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
```

```
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275             280             285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
        290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315             320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Lys Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
    595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn Leu Glu Lys Thr
            645
```

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<210> 4
<211> 647
<212> PRT
<213> Staphylococcus aureus

<400> 4
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Ala Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Glu Asn Gly
145                 150                 155                 160
Glu Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
            275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
            355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
```

```
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Thr Thr Pro Thr Lys Val Val
    530             535             540
Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Ala Ser Ser Lys Thr Thr
545             550             555             560
Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys Asp Ser
            565             570             575
Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly His Thr
        580             585             590
Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys Ser Leu
        595             600             605
Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro Leu Met
    610             615             620
Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro Arg Lys
625             630             635             640
Arg Lys Asn Leu Glu Lys Pro
            645
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<210> 5
<211> 645
<212> PRT
<213> Staphylococcus aureus

<400> 5
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Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1             5              10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr Asn
        35              40              45
Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr Thr
    50              55              60
Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser Val
65              70              75              80
Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala Lys
            85              90              95
```

Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Ala Val Lys Pro
        100   105   110

Ala Thr Lys Ala Asp Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu Leu
      115   120   125

Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser Ala
   130   135   140

Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Glu Asn Gly Glu
145   150   155   160

Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val Ile
          165   170   175

Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly Gln
        180   185   190

Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro Ile
      195   200   205

Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg Phe
      210   215   220

Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr His
225   230   235   240

Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe Ala
          245   250   255 .

Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp Tyr
        260   265   270

Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu Glu
      275   280   285

Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu Lys
      290   295   300

Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala Leu
305   310   315   320

Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln Pro
          325   330   335

Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val Tyr
        340   345   350

Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys His
      355   360   365

Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met Glu
      370   375   380

Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln Arg
385   390   395   400

Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile Ile
          405   410   415

Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys Val
        420   425   430

His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile Val
        435   440   445

Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys Lys
      450   455   460

Glu Gln Gln Asp Asn Ser Ala Lys Arg Glu Ala Thr Pro Ala Thr Pro
465   470   475   480

Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln Asp
          485   490   495

Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu Asn
        500   505   510

Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys Pro
      515   520   525

```
Ala Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val Val
    530                 535             540
Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys Thr
545                 550             555                 560
Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys Asp
                565             570                 575
Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly His
            580             585             590
Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys Ser
        595             600             605
Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro Leu
    610             615             620
Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro Arg
625             630             635                 640
Lys Arg Lys Asn Leu
            645


<210> 6
<211> 645
<212> PRT
<213> Staphylococcus aureus

<400> 6
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr Asn
        35              40              45
Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr Thr
    50              55              60
Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser Val
65              70              75              80
Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala Lys
                85              90              95
Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Ala Val Lys Pro
            100             105             110
Ala Thr Lys Ala Asp Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu Leu
        115             120             125
Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser Ala
    130             135             140
Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Glu Asn Gly Glu
145             150             155             160
Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val Ile
                165             170             175
Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly Gln
            180             185             190
Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro Ile
        195             200             205
Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg Phe
    210             215             220
Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr His
225             230             235             240
```

```
Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe Ala
             245             250             255
Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp Tyr
             260             265             270
Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu Glu
             275             280             285
Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu Lys
             290             295             300
Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala Leu
305             310             315             320
Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln Pro
             325             330             335
Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val Tyr
             340             345             350
Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys His
             355             360             365
Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met Glu
             370             375             380
Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln Arg
385             390             395             400
Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile Ile
             405             410             415
Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys Val
             420             425             430
His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile Val
             435             440             445
Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys Lys
             450             455             460
Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr Pro
465             470             475             480
Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln Asp
             485             490             495
Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu Asn
             500             505             510
Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys Pro
             515             520             525
Ala Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val Val
             530             535             540
Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys Thr
545             550             555             560
Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys Asp
             565             570             575
Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly His
             580             585             590
Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys Ser
             595             600             605
Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro Leu
             610             615             620
Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro Arg
625             630             635             640
Lys Arg Lys Asn Leu
             645
```

21349YP

<210> 7
<211> 654
<212> PRT
<213> Staphylococcus aureus

<400> 7
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1   5   10   15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20   25   30
Met Ser Asn Gly Glu Ala Lys Ala Ala Glu Glu Thr Gly Gly Thr Ile
        35   40   45
Thr Glu Thr Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr Thr
    50   55   60
Thr Glu Lys Ala Pro Glu Ala Lys Pro Val Ala Asn Ala Val Ser Val
65   70   75   80
Ser Asn Lys Glu Val Val Ala Pro Thr Thr Glu Thr Lys Glu Ala Lys
                85   90   95
Glu Val Lys Glu Val Lys Ala Pro Asn Glu Thr Lys Glu Val Lys Pro
            100   105   110
Ala Ala Lys Ser Asp Asn Asn Thr Tyr Pro Ile Leu Asn Glu Glu Leu
        115   120   125
Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser Ala
    130   135   140
Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly Thr
145   150   155   160
Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val Ile
                165   170   175
Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly Gln
            180   185   190
Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro Ile
            195   200   205
Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg Phe
    210   215   220
Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr His
225   230   235   240
Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe Ala
                245   250   255
Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp Tyr
            260   265   270
Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu Glu
        275   280   285
Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu Lys
    290   295   300
Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Glu Thr Lys Lys Ala Leu
305   310   315   320
Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln Pro
                325   330   335
Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val Tyr
            340   345   350
Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys His
        355   360   365
Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met Glu
    370   375   380

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```
Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Glu Arg
385                 390             395                 400
Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile Ile
            405             410             415
Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys Val
        420             425             430
His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile Val
        435             440             445
Asp Lys Glu Ala Phe Thr Lys Ala Asn Ala Asp Lys Ser Asn Lys Lys
    450             455             460
Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr Pro
465             470             475             480
Ser Lys Pro Thr Thr Ala Pro Val Glu Lys Glu Ser Gln Lys Gln Asp
            485             490             495
Ser Gln Lys Asp Asp Asn Lys Gln Ser Pro Ser Val Glu Lys Glu Ile
        500             505             510
Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys Pro
        515             520             525
Ala Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val Val
    530             535             540
Ser Ala Thr Gln Asn Val Ala Lys Pro Thr Ser Ala Ser Ser Glu Thr
545             550             555             560
Thr Lys Gly Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys Asp
            565             570             575
Asn Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly His
        580             585             590
Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys Ser
        595             600             605
Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro Leu
    610             615             620
Met Ala Leu Leu Ala Leu Ser Ser Ile Ile Ala Phe Val Leu Pro Arg
625             630             635             640
Lys Arg Lys Asn Leu Glu Lys Pro Val Arg Ala Asn Ser Ser
            645             650
```

<210> 8
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 8
```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1           5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
```

```
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
        180             185             190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Gly Glu Asn Ile His Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Asn Pro Asp Lys Phe Val Asp Glu Glu Asp
            260             265             270
Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275             280             285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305             310             315             320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355             360             365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Lys Thr Thr Asn Asp Ser Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Pro Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
        420             425             430
Val Val Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ile Asn Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
```

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```
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645


<210> 9
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 9
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
            35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Ser
        130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
```

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```
Val Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210                     215             220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230             235                     240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245             250                     255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Leu Gln Glu Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                     320
Leu Asp Glu Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
                325                 330                     335
Pro Thr Asn Asp Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390                 395                     400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Leu
            405             410                 415
Ile Phe Pro Tyr Ile Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425                 430
Val His Val Lys Thr Ile Asp Tyr Glu Gly Gln Tyr His Val Arg Ile
    435             440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                     480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515             520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                     560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                     575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                     640
```

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```
Arg Lys Arg Lys Asn
                645


<210> 10
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 10
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Asp Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Thr
        130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Thr Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Thr Lys Pro Glu Ile Glu Leu Gly Leu Gln Thr Ala
            180                 185                 190
Gln Phe Trp Lys Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Val Lys Leu Val Ser Tyr Asp Ser Val Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Arg Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Tyr Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Tyr Lys Thr Glu Glu Asp
                260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Leu Gln Asp Lys Leu Pro Glu
        290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Asp Asp Thr Arg Lys Ala
305                 310                 315                 320
Leu Asp Asp Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
```

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```
Pro Thr Asn Asp Lys Leu Thr Asp Leu Gln Glu Thr Lys Phe Val Val
        340             345             350
Phe Glu Ser Val Glu Asn Asn Glu Ser Val Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Ala Met Leu Asn Gly Lys Lys Tyr Val Val Met
370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Ile Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Val Ser Lys Asp Ala Lys Asn Asn Ser Arg Thr Leu
        405             410             415
Ile Phe Pro Tyr Ile Glu Gly Lys Thr Val Tyr Asp Ala Ile Val Lys
        420             425             430
Val His Val Lys Thr Ile Asp Tyr Glu Gly Gln Tyr His Val Arg Ile
        435             440             445
Ile Asp Lys Asp Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
        450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
        485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
        565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
        645
```

<210> 11
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 11
```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
        20              25              30
```

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```
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
            165             170             175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275             280             285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315             320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
        370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
```

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```
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
                500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
                580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
            595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
                645


<210> 12
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 12
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
```

```
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
              165             170             175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
          180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
      195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
      210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Gly Lys Tyr Asp Tyr Thr Leu Met Glu Phe
              245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
          260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
          275             280             285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
      290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315             320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
              325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
          340             345             350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
      355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
      370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
              405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
          420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
      435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
      450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
              485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
          500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
          515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
      530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
              565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
          580             585             590
```

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```
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
        645
```

```
<210> 13
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 13
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
        20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130                 135                 140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
            275                 280                 285
```

```
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310                 315             320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645
```

<210> 14
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

```
<400> 14
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1                   5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
        180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
    195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
        260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
```

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```
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
            645


<210> 15
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 15
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
```

Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115   120   125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130   135   140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145   150   155   160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165   170   175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180   185   190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195   200   205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210   215   220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225   230   235   240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245   250   255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260   265   270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275   280   285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290   295   300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305   310   315   320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325   330   335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340   345   350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355   360   365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370   375   380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385   390   395   400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405   410   415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420   425   430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435   440   445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450   455   460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465   470   475   480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485   490   495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500   505   510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515   520   525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530   535   540

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```
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
            595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645


<210> 16
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 16
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5              10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
    195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
```

```
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                     250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
    595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
            645
```

<210> 17
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 17
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1   5   10   15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20   25   30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35   40   45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50   55   60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65   70   75   80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85   90   95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100   105   110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115   120   125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130   135   140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145   150   155   160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165   170   175
Ile Phe Thr Lys Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180   185   190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195   200   205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
        210   215   220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225   230   235   240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245   250   255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260   265   270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275   280   285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
        290   295   300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305   310   315   320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325   330   335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340   345   350

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```
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645
```

```
<210> 18
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 18
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
```

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```
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
        100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
    115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
        260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275             280             285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315             320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
```

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```
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645


<210> 19
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 19
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1           5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
```

```
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180                     185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                 230                 235                     240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
        290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                 310                 315                     320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
        370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                     400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
                405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
        450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                     480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                     560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
```

```
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645


<210> 20
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 20
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
```

```
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
                340                 345                 350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Lys
            355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
        370                 375                 380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
                405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
                420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
            435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
        450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645
```

<210> 21
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 21

```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
        20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
    35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
        180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
        260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275             280             285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305             310             315             320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
        340             345             350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
        420             425             430
```

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```
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        ·435              440                  445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450              455                  460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465              470                  475                      480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485              490                  495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                  505                  510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                  520                  525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                  535                  540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                  550                  555                      560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                  570                  575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580                  585                  590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                  600                  605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                  615                  620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                  630                  635                      640
Arg Lys Arg Lys Asn
                645


<210> 22
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 22
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                      80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
```

```
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275             280             285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305             310             315             320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
    355             360             365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
```

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```
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
                645
```

<210> 23
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 23
```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
        100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245             250             255
```

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```
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
        290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355                 360                 365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
    595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645
```

<210> 24
<211> 645
<212> PRT

```
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 24
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
        130                 135                 140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165                 170                 175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Asn Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
        290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355                 360                 365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
        370                 375                 380
```

```
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395                     400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410                     415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
            420             425                     430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470                 475                     480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                     495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                 505                     510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                     560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
    595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                     640
Arg Lys Arg Lys Asn
                645
```

```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1             5                 10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr
        35              40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
```

```
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                      90                      95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                     105                     110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                     120                     125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
        130                     135                     140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145                     150                     155                     160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165                     170                     175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180                     185                     190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                     200                     205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210                     215                     220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                     230                     235                     240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245                     250                     255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                     265                     270
Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
            275                     280                     285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
        290                     295                     300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                     310                     315                     320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                     330                     335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340                     345                     350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
            355                     360                     365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370                     375                     380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385                     390                     395                     400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
                405                     410                     415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
            420                     425                     430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                     440                     445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                     455                     460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                     470                     475                     480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485                     490                     495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                     505                     510
```

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```
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515             . 520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
    595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645


<210> 26
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 26
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1             5             10             15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20             25             30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
            35             40             45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50             55             60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65             70             75             80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85             90             95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195             200             205
```

```
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
                260                 265                 270
Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355                 360                 365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val Val Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
```

-45-

```
Arg Lys Arg Lys Asn
                645


<210> 27
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 27
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
                260                 265                 270
Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305                 310                 315                 320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
```

```
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355             360             365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
        420             425             430
Val Val Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ile Asn Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645
```

```
<210> 28
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 28
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
```

```
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
        100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130             135             140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
            165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
        180             185             190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
    195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
        260             265             270
Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275             280             285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305             310             315             320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
        340             345             350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355             360             365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
370             375             380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Pro Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val Val Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ile Asn Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
450             455             460
```

```
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
                500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645


<210> 29
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 29
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
                100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Trp Arg Pro Ile Asp Phe Glu Met Lys Asn Asp Lys Gly
145                 150                 155                 160
```

```
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Glu Pro Ala Arg Val
                165             170             175
Ile Phe Thr Lys Ser Lys Pro Ile Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Ile Lys Leu Val Ser Tyr Asp Thr Asp Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Glu Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Phe Gly Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Val Phe
                245             250             255
Ala Gln Pro Ile Tyr Asn Asn Pro Asp Lys Phe Lys Thr Glu Glu Asp
            260             265             270
Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
            275             280             285
Glu Arg Gln Val Tyr Glu Leu Glu Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Gln Thr Lys Lys Ala
305             310             315             320
Leu Ala Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Ala His Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Ser Glu Ser Met Met Asp Thr Phe Val Glu
        355             360             365
His Pro Ile Lys Thr Gly Thr Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Lys Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Lys
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Pro Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Ala Leu Tyr Asp Ala Ile Val Lys
        420             425             430
Val Val Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ile Asn Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
```

```
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645
```

<210> 30
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 30
```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
            275                 280                 285
```

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```
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315                 320
Leu Asp Glu Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
            325             330                 335
Pro Thr Asn Asp Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635                 640
Arg Lys Arg Lys Asn
            645
```

<210> 31
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 31

```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
        290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
            325                 330                 335
Pro Thr Asn Asp Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
        340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
        370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
```

```
Ile Phe Pro Tyr Ile Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
            435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
        450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
            595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645


<210> 32
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 32
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
```

```
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
    115                     120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Ser
    130                 135             140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150             155                     160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
            165             170                     175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
        180             185                     190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200                     205
Val Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210             215                     220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230             235                     240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
            245             250                     255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265                     270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275                 280             285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310             315                     320
Leu Asp Glu Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
            325             330                     335
Pro Thr Asn Asp Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345                     350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
    355                 360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390             395                     400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410                     415
Ile Phe Pro Tyr Ile Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425                     430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435                 440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470             475                     480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490                     495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505                     510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515                 520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
```

```
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
        610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645


<210> 33
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 33
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Ser
        130             135             140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
            165             170             175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195             200             205
Val Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
        210             215             220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225             230             235             240
```

```
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Asp Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Leu
            405                 410                 415
Ile Phe Pro Tyr Ile Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
            645
```

-57-

```
<210> 34
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 34
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
            35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Ser
    130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Val Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
            275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Leu Gln Glu Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Asp Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
```

```
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
        370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Leu
            405             410             415
Ile Phe Pro Tyr Ile Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
        450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645


<210> 35
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 35
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5               10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
```

```
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
                100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
            165                 170                 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
        180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195                 200                 205
Val Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
```

```
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485              490              495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500              505              510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515              520              525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530              535              540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545              550              555              560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565              570              575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580              585              590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595              600              605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610              615              620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625              630              635              640
Arg Lys Arg Lys Asn
            645


<210> 36
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 36
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5              10              15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
            35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115             120             125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
            130             135             140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
            165             170             175
```

```
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
        180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
        195                 200                 205
Val Lys Leu Val Ser Tyr Asp Ser Val Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Ser Val Ser Asn Gly Thr Arg Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Tyr Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
        260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
        290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
                325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
        340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
                405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
        530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
```

```
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645


<210> 37
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 37
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
        50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
        130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Asp Thr Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
                180                 185                 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
                195                 200                 205
Val Lys Leu Val Ser Tyr Asp Ser Val Lys Asp Tyr Ala Tyr Ile Arg
        210                 215                 220
Phe Ser Val Ser Asn Gly Thr Arg Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                 240
His Tyr Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
                245                 250                 255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
        290                 295                 300
```

```
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
                645
```

<210> 38
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 38

```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                      15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
          20              25                      30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
          35              40                      45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
          50              55                      60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                      80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
              85                  90                      95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
          100                 105                     110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
          115                 120                     125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His Ser
          130                 135                     140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                     160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Thr Val Lys Pro Ala Arg Val
              165                 170                     175
Ile Phe Thr Asp Thr Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
          180                 185                     190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
          195                 200                     205
Val Lys Leu Val Ser Tyr Asp Ser Val Lys Asp Tyr Ala Tyr Ile Arg
          210                 215                     220
Phe Ser Val Ser Asn Gly Thr Arg Ala Val Lys Ile Val Ser Ser Thr
225                 230                 235                     240
His Tyr Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
              245                 250                     255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
          260                 265                     270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
          275                 280                     285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
          290                 295                     300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305                 310                 315                     320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
              325                 330                     335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
              340                 345                     350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
          355                 360                     365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
          370                 375                     380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                     400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
              405                 410                     415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
          420                 425                     430
```

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Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435   440   445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450   455   460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465   470   475   480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
                485   490   495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500   505   510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
            515   520   525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530   535   540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545   550   555   560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
                565   570   575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580   585   590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595   600   605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610   615   620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625   630   635   640
Arg Lys Arg Lys Asn
                645

<210> 39
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 39
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
  1   5   10   15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
                20   25   30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
            35   40   45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50   55   60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65   70   75   80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
                85   90   95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
                100   105   110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115   120   125

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```
Leu Arg Asp Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Thr
    130             135             140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Thr Val Lys Pro Ala Arg Val
            165             170             175
Ile Phe Thr Asp Thr Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195             200             205
Val Lys Leu Val Ser Tyr Asp Ser Val Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Arg Ala Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Tyr Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
            245             250             255
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu Asp
            260             265             270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
    275             280             285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro Glu
    290             295             300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys Ala
305             310             315             320
Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val Gln
            325             330             335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
            340             345             350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
            355             360             365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370             375             380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385             390             395             400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405             410             415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
            420             425             430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
    435             440             445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450             455             460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465             470             475             480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485             490             495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
            500             505             510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
    515             520             525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530             535             540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545             550             555             560
```

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```
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565             570             575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
            580             585             590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
            595             600             605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610             615             620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625             630             635             640
Arg Lys Arg Lys Asn
            645


<210> 40
<211> 645
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 40
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
 1               5                  10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20              25              30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35              40              45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50              55              60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65              70              75              80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85              90              95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100             105             110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115             120             125
Leu Arg Asp Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Glu His Thr
    130             135             140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145             150             155             160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Thr Val Lys Pro Ala Arg Val
            165             170             175
Ile Phe Thr Asp Thr Lys Pro Glu Ile Glu Leu Gly Leu Gln Thr Ala
            180             185             190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
    195             200             205
Val Lys Leu Val Ser Tyr Asp Ser Val Lys Asp Tyr Ala Tyr Ile Arg
    210             215             220
Phe Ser Val Ser Asn Gly Thr Arg Ala Val Lys Ile Val Ser Ser Thr
225             230             235             240
His Tyr Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
            245             250             255
```

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```
Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Tyr Lys Thr Glu Glu Asp
            260                 265                 270
Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr Leu
        275                 280                 285
Glu Arg Gln Val Tyr Glu Leu Asn Lys Leu Gln Asp Lys Leu Pro Glu
    290                 295                 300
Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Asp Thr Lys Lys Ala
305                 310                 315                 320
Leu Asp Asp Gln Val Lys Ser Ala Val Thr Glu Phe Gln Asn Val Gln
            325                 330                 335
Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val Val
        340                 345                 350
Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val Lys
        355                 360                 365
His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val Met
    370                 375                 380
Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly Gln
385                 390                 395                 400
Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr Ile
            405                 410                 415
Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val Lys
        420                 425                 430
Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg Ile
        435                 440                 445
Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn Lys
    450                 455                 460
Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala Thr
465                 470                 475                 480
Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys Gln
            485                 490                 495
Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys Glu
        500                 505                 510
Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr Lys
        515                 520                 525
Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys Val
    530                 535                 540
Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser Lys
545                 550                 555                 560
Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala Lys
            565                 570                 575
Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp Gly
        580                 585                 590
His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala Lys
        595                 600                 605
Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu Pro
    610                 615                 620
Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu Pro
625                 630                 635                 640
Arg Lys Arg Lys Asn
            645
```

<210> 41
<211> 639
<212> PRT

<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 41
```
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1               5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
        115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Asp His Ser
    130                 135                 140
Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp Gly
145                 150                 155                 160
Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg Val
                165                 170                 175
Ile Phe Thr Lys Thr Gly Pro Val Ile Glu Leu Gly Leu Lys Thr Ala
            180                 185                 190
Ser Thr Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Pro Val Ser Asn Gly Thr Arg Asp Val Lys Ile Val Ser Ser Ile
225                 230                 235                 240
Glu Tyr Gly Glu Asn Ile His Glu Asp Tyr Asp Tyr Thr Leu Met Val
                245                 250                 255
Phe Ala Gln Pro Ile Thr Asn Asn Pro Asp Asp Tyr Val Asp Glu Glu
            260                 265                 270
Thr Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr His Lys Ala Lys Thr
        275                 280                 285
Leu Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro
    290                 295                 300
Glu Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys
305                 310                 315                 320
Ala Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val
            325                 330                 335
Gln Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val
        340                 345                 350
Val Phe Glu Ser Glu Glu Asn Ser Glu Ser Val Met Asp Gly Phe Val
        355                 360                 365
Glu His Pro Phe Tyr Thr Ala Thr Leu Asn Gly Gln Lys Tyr Val Val
    370                 375                 380
```

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```
Met Lys Thr Lys Asp Asp Ser Tyr Trp Lys Asp Leu Ile Val Glu Gly
385             390             395                     400
Lys Arg Val Thr Thr Val Ser Lys Asp Pro Lys Asn Asn Ser Arg Thr
            405             410                     415
Ile Ile Phe Pro Tyr Val Glu Gly Lys Ala Val Tyr Asn Ala Ile Val
            420             425                 430
Lys Val Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg
        435             440                 445
Ile Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn
    450             455                 460
Lys Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala
465             470                 475                     480
Thr Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys
            485             490                     495
Gln Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys
            500             505                     510
Glu Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr
        515             520             525
Lys Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys
    530             535             540
Val Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser
545             550             555                     560
Lys Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala
            565             570                 575
Lys Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp
        580             585                 590
Gly His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala
        595             600                 605
Lys Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu
    610             615                 620
Pro Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val
625             630                 635
```

<210> 42
<211> 890
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

<400> 42

```
Met Asn Lys His His Pro Lys Leu Arg Ser Phe Tyr Ser Ile Arg Lys
  1             5                 10                  15
Ser Thr Leu Gly Val Ala Ser Val Ile Val Ser Thr Leu Phe Leu Ile
            20              25                  30
Thr Ser Gln His Gln Ala Gln Ala Ala Glu Asn Thr Asn Thr Ser Asp
        35              40                  45
Lys Ile Ser Glu Asn Gln Asn Asn Asn Ala Thr Thr Thr Gln Gln Pro
    50              55                  60
Lys Asp Thr Asn Gln Thr Gln Pro Ala Thr Gln Pro Val Ile Thr Ala
65              70                  75                      80
Lys Asn Tyr Pro Ala Ala Asp Glu Ser Leu Lys Asp Ala Ile Lys Asp
                85                  90                  95
```

```
Pro Ala Leu Glu Asn Lys Glu His Asp Ile Gly Pro Arg Glu Gln Val
            100                 105                 110
Asn Phe Gln Leu Leu Asp Lys Asn Asn Glu Thr Gln Tyr Tyr His Phe
        115                 120                 125
Phe Ser Ile Lys Asp Pro Ala Asp Val Tyr Tyr Thr Lys Lys Lys Ala
    130                 135                 140
Glu Val Glu Leu Asp Ile Asn Thr Ala Ser Thr Trp Lys Lys Phe Glu
145                 150                 155                 160
Val Tyr Glu Asn Asn Gln Lys Leu Pro Val Arg Leu Val Ser Tyr Ser
                165                 170                 175
Pro Val Pro Glu Asp His Ala Tyr Ile Arg Phe Pro Val Ser Asp Gly
        180                 185                 190
Thr Gln Glu Leu Lys Ile Val Ser Ser Thr Gln Ile Asp Asp Gly Glu
        195                 200                 205
Glu Thr Asn Tyr Asp Tyr Thr Lys Leu Val Phe Ala Lys Pro Ile Tyr
    210                 215                 220
Asn Asp Pro Ser Leu Val Lys Ser Asp Thr Asn Asp Ala Val Val Thr
225                 230                 235                 240
Asn Asp Gln Ser Ser Ser Asp Ala Ser Asn Gln Thr Asn Thr Asn Thr
                245                 250                 255
Ser Asn Gln Asn Thr Ser Thr Thr Asn Asn Ala Asn Asn Gln Pro Gln
        260                 265                 270
Ala Thr Thr Asn Met Ser Gln Pro Ala Gln Pro Lys Ser Ser Ala Asn
        275                 280       .         285
Ala Asp Gln Ala Ser Ser Gln Pro Ala His Glu Thr Asn Ser Asn Gly
        290                 295                 300
Asn Thr Asn Asp Lys Thr Asn Glu Ser Ser Asn Gln Ser Asp Val Asn
305                 310                 315                 320
Gln Gln Tyr Pro Pro Ala Asp Glu Ser Leu Gln Asp Ala Ile Lys Asn
                325                 330                 335
Pro Ala Ile Lys Asp Lys Asp His Ser Ala Pro Asn Ser Arg Pro Ile
        340                 345                 350
Asp Phe Glu Met Lys Lys Lys Asp Gly Thr Gln Gln Phe Tyr His Tyr
        355                 360                 365
Ala Ser Ser Val Lys Pro Ala Arg Val Ile Phe Thr Asp Ser Lys Pro
    370                 375                 380
Glu Ile Glu Leu Gly Leu Gln Ser Gly Gln Phe Trp Arg Lys Phe Glu
385                 390                 395                 400
Val Tyr Glu Gly Asp Lys Lys Leu Pro Ile Lys Leu Val Ser Tyr Asp
                405                 410                 415
Thr Val Lys Asp Tyr Ala Tyr Ile Arg Phe Ser Val Ser Asn Gly Thr
        420                 425                 430
Lys Ala Val Lys Ile Val Ser Ser Thr His Phe Asn Asn Lys Glu Glu
        435                 440                 445
Lys Tyr Asp Tyr Thr Leu Met Glu Phe Ala Gln Pro Ile Tyr Asn Ser
    450                 455                 460
Ala Asp Lys Phe Lys Thr Glu Glu Asp Tyr Lys Ala Glu Lys Leu Leu
465                 470                 475                 480
Ala Pro Tyr Lys Lys Ala Lys Thr Leu Glu Arg Gln Val Tyr Glu Leu
                485                 490                 495
Asn Lys Ile Gln Asp Lys Leu Pro Glu Lys Leu Lys Ala Glu Tyr Lys
        500                 505                 510
Lys Lys Leu Glu Asp Thr Lys Lys Ala Leu Asp Glu Gln Val Lys Ser
        515                 520                 525
```

```
Ala Ile Thr Glu Phe Gln Asn Val Gln Pro Thr Asn Glu Lys Met Thr
    530                 535             540
Asp Leu Gln Asp Thr Lys Tyr Val Val Tyr Glu Ser Val Glu Asn Asn
545                 550             555                 560
Glu Ser Met Met Asp Thr Phe Val Lys His Pro Ile Lys Thr Gly Met
            565             570                 575
Leu Asn Gly Lys Lys Tyr Met Val Met Glu Thr Thr Asn Asp Asp Tyr
        580             585             590
Trp Lys Asp Phe Met Val Glu Gly Gln Arg Val Arg Thr Ile Ser Lys
        595             600             605
Asp Ala Lys Asn Asn Thr Arg Thr Ile Ile Phe Pro Tyr Val Glu Gly
    610             615             620
Lys Thr Leu Tyr Asp Ala Ile Val Lys Val His Val Lys Thr Ile Asp
625             630             635                 640
Tyr Asp Gly Gln Tyr His Val Arg Ile Ile Asn Gln Asp Ile Asn Thr
            645             650                 655
Lys Asp Asp Asp Thr Ser Gln Asn Asn Thr Ser Glu Pro Leu Asn Val
            660             665             670
Gln Thr Gly Gln Glu Gly Lys Val Ala Asp Thr Asp Val Ala Glu Asn
        675             680             685
Ser Ser Thr Ala Thr Asn Pro Lys Asp Ala Ser Asp Lys Ala Asp Val
        690             695             700
Ile Glu Pro Glu Ser Asp Val Val Lys Asp Ala Asp Asn Asn Ile Asp
705             710             715                 720
Lys Asp Val Gln His Asp Val Asp His Leu Ser Asp Met Ser Asp Asn
            725             730             735
Asn His Phe Asp Lys Tyr Asp Leu Lys Glu Met Asp Thr Gln Ile Ala
            740             745             750
Lys Asp Thr Asp Arg Asn Val Asp Asn Ser Val Gly Met Ser Ser Asn
            755             760             765
Val Asp Thr Asp Lys Asp Ser Asn Lys Asn Lys Asp Lys Val Ile Gln
    770             775             780
Leu Ala His Ile Ala Asp Lys Asn Asn His Thr Gly Lys Ala Ala Lys
785             790             795                 800
Leu Asp Val Val Lys Gln Asn Tyr Asn Asn Thr Asp Lys Val Thr Asp
            805             810             815
Lys Lys Thr Thr Glu His Leu Pro Ser Asp Ile His Lys Thr Val Asp
        820             825             830
Lys Thr Val Lys Thr Lys Glu Lys Ala Gly Thr Pro Ser Lys Glu Asn
        835             840             845
Lys Leu Ser Gln Ser Lys Met Leu Pro Lys Thr Gly Glu Thr Thr Ser
    850             855             860
Ser Gln Ser Trp Trp Gly Leu Tyr Ala Leu Leu Gly Met Leu Ala Leu
865             870             875                 880
Phe Ile Pro Lys Phe Arg Lys Glu Ser Lys
            885             890
```

<210> 43
<211> 639
<212> PRT
<213> Artificial Sequence

<220>
<223> Hybrid sequence

```
<400> 43
Met Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg Lys
1                   5                   10                  15
Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu Leu
            20                  25                  30
Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly Thr
        35                  40                  45
Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr Thr
    50                  55                  60
Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65                  70                  75                  80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
            85                  90                  95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
            100                 105                 110
Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
            115                 120                 125
Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Ile Asp Lys Glu His Thr
    130                 135                 140
Ala Asp Asn Trp Arg Pro Ile Asp Phe Gln Met Lys Asn Asp Lys Gly
145                 150                 155                 160
Glu Arg Gln Phe Tyr His Tyr Ala Ser Thr Val Glu Pro Ala Thr Val
            165                 170                 175
Ile Phe Thr Lys Thr Gly Pro Val Ile Glu Leu Gly Leu Lys Thr Ala
            180                 185                 190
Ser Thr Trp Lys Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
            195                 200                 205
Val Glu Leu Val Ser Tyr Asp Ser Asp Lys Asp Tyr Ala Tyr Ile Arg
    210                 215                 220
Phe Pro Val Ser Asn Gly Thr Arg Asp Val Lys Ile Val Ser Ser Ile
225                 230                 235                 240
Glu Tyr Gly Glu Asn Ile His Glu Asp Tyr Asp Tyr Thr Leu Met Val
            245                 250                 255
Phe Ala Gln Pro Ile Thr Asn Asn Pro Asp Asp Tyr Val Asp Glu Glu
            260                 265                 270
Thr Tyr Asn Leu Gln Lys Leu Leu Ala Pro Tyr His Lys Ala Lys Thr
    275                 280                 285
Leu Glu Arg Gln Val Tyr Glu Leu Glu Lys Leu Gln Glu Lys Leu Pro
    290                 295                 300
Glu Lys Tyr Lys Ala Glu Tyr Lys Lys Lys Leu Asp Gln Thr Arg Val
305                 310                 315                 320
Glu Leu Ala Asp Gln Val Lys Ser Ala Val Thr Glu Phe Glu Asn Val
            325                 330                 335
Thr Pro Thr Asn Asp Gln Leu Thr Asp Leu Gln Glu Ala His Phe Val
            340                 345                 350
Val Phe Glu Ser Glu Glu Asn Ser Glu Ser Val Met Asp Gly Phe Val
            355                 360                 365
Glu His Pro Phe Tyr Thr Ala Thr Leu Asn Gly Gln Lys Tyr Val Val
    370                 375                 380
Met Lys Thr Lys Asp Asp Ser Tyr Trp Lys Asp Leu Ile Val Glu Gly
385                 390                 395                 400
Lys Arg Val Thr Thr Val Ser Lys Asp Pro Lys Asn Asn Ser Arg Thr
            405                 410                 415
```

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```
Leu Ile Phe Pro Tyr Ile Pro Asp Lys Ala Val Tyr Asn Ala Ile Val
            420                 425                 430
Lys Val Val Val Ala Asn Ile Gly Tyr Glu Gly Gln Tyr His Val Arg
            435                 440                 445
Ile Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn
        450                 455                 460
Lys Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala
465                 470                 475                 480
Thr Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys
                485                 490                 495
Gln Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys
            500                 505                 510
Glu Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr
            515                 520                 525
Lys Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys
        530                 535                 540
Val Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser
545                 550                 555                 560
Lys Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala
                565                 570                 575
Lys Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp
            580                 585                 590
Gly His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala
            595                 600                 605
Lys Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu
        610                 615                 620
Pro Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val
625                 630                 635


<210> 44
<211> 654
<212> PRT
<213> Artificial Sequence

<220>
<223> 0657 mutated protein

<400> 44
Met Gly Asn Lys Gln Gln Lys Glu Phe Lys Ser Phe Tyr Ser Ile Arg
  1               5                  10                  15
Lys Ser Ser Leu Gly Val Ala Ser Val Ala Ile Ser Thr Leu Leu Leu
            20                  25                  30
Leu Met Ser Asn Gly Glu Ala Gln Ala Ala Ala Glu Glu Thr Gly Gly
        35                  40                  45
Thr Asn Thr Glu Ala Gln Pro Lys Thr Glu Ala Val Ala Ser Pro Thr
    50                  55                  60
Thr Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val
65                  70                  75                  80
Ser Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu
                85                  90                  95
Ala Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val
            100                 105                 110
Lys Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln
        115                 120                 125
```

```
Glu Leu Arg Glu Ala Ile Lys Asn Pro Ala Ile Lys Asp Lys Asp His
    130                 135             140
Ser Ala Pro Asn Ser Arg Pro Ile Asp Phe Glu Met Lys Lys Lys Asp
145                 150             155                 160
Gly Thr Gln Gln Phe Tyr His Tyr Ala Ser Ser Val Lys Pro Ala Arg
                165             170             175
Val Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser
            180             185             190
Gly Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu
            195             200             205
Pro Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile
    210             215             220
Arg Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser
225             230             235             240
Thr His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu
            245             250             255
Phe Ala Gln Pro Ile Tyr Asn Ser Ala Asp Lys Phe Lys Thr Glu Glu
            260             265             270
Asp Tyr Lys Ala Glu Lys Leu Leu Ala Pro Tyr Lys Lys Ala Lys Thr
    275             280             285
Leu Glu Arg Gln Val Tyr Glu Leu Asn Lys Ile Gln Asp Lys Leu Pro
    290             295             300
Glu Lys Leu Lys Ala Glu Tyr Lys Lys Lys Leu Glu Asp Thr Lys Lys
305             310             315             320
Ala Leu Asp Glu Gln Val Lys Ser Ala Ile Thr Glu Phe Gln Asn Val
            325             330             335
Gln Pro Thr Asn Glu Lys Met Thr Asp Leu Gln Asp Thr Lys Tyr Val
            340             345             350
Val Tyr Glu Ser Val Glu Asn Asn Glu Ser Met Met Asp Thr Phe Val
    355             360             365
Lys His Pro Ile Lys Thr Gly Met Leu Asn Gly Lys Lys Tyr Met Val
    370             375             380
Met Glu Thr Thr Asn Asp Asp Tyr Trp Lys Asp Phe Met Val Glu Gly
385             390             395             400
Gln Arg Val Arg Thr Ile Ser Lys Asp Ala Lys Asn Asn Thr Arg Thr
            405             410             415
Ile Ile Phe Pro Tyr Val Glu Gly Lys Thr Leu Tyr Asp Ala Ile Val
            420             425             430
Lys Val His Val Lys Thr Ile Asp Tyr Asp Gly Gln Tyr His Val Arg
    435             440             445
Ile Val Asp Lys Glu Ala Phe Thr Lys Ala Asn Thr Asp Lys Ser Asn
    450             455             460
Lys Lys Glu Gln Gln Asp Asn Ser Ala Lys Lys Glu Ala Thr Pro Ala
465             470             475             480
Thr Pro Ser Lys Pro Thr Pro Ser Pro Val Glu Lys Glu Ser Gln Lys
            485             490             495
Gln Asp Ser Gln Lys Asp Asp Asn Lys Gln Leu Pro Ser Val Glu Lys
            500             505             510
Glu Asn Asp Ala Ser Ser Glu Ser Gly Lys Asp Lys Thr Pro Ala Thr
    515             520             525
Lys Pro Thr Lys Gly Glu Val Glu Ser Ser Ser Thr Thr Pro Thr Lys
    530             535             540
Val Val Ser Thr Thr Gln Asn Val Ala Lys Pro Thr Thr Ala Ser Ser
545             550             555             560
```

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```
Lys Thr Thr Lys Asp Val Val Gln Thr Ser Ala Gly Ser Ser Glu Ala
            565                 570             575
Lys Asp Ser Ala Pro Leu Gln Lys Ala Asn Ile Lys Asn Thr Asn Asp
            580                 585             590
Gly His Thr Gln Ser Gln Asn Asn Lys Asn Thr Gln Glu Asn Lys Ala
            595                 600             605
Lys Ser Leu Pro Gln Thr Gly Glu Glu Ser Asn Lys Asp Met Thr Leu
    610                 615             620
Pro Leu Met Ala Leu Leu Ala Leu Ser Ser Ile Val Ala Phe Val Leu
625                 630             635                 640
Pro Arg Lys Arg Lys Asn Leu Glu His His His His His His
                645             650
```

```
<210> 45
<211> 1938
<212> DNA
<213> Artificial Sequence

<220>
<223> 0657 cDNA

<400> 45
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gcagctgaag aaacaggtgg tacaaataca gaagcacaac caaaaactga agcagttgca 180
agtccaacaa caacatctga aaaagctcca gaaactaaac cagtagctaa tgctgtctca 240
gtatctaata agaagttga ggcccctact tctgaaacaa agaagctaa agaagttaaa 300
gaagttaaag ccccctaagga aacaaaagaa gttaaaccag cagcaaaagc cactaacaat 360
acatatccta ttttgaatca ggaacttaga gaagcgatta aaaccctgc aataaaagac 420
aaagatcata gcgcaccaaa ctctcgtcca attgattttg aaatgaaaaa gaaagatgga 480
actcaacagt tttatcatta tgcaagttct gttaaacctg ctagagttat tttcactgat 540
tcaaaaccag aaattgaatt aggattacaa tcaggtcaat tttggagaaa atttgaagtt 600
tatgaaggtg acaaaaagtt gccaattaaa ttagtatcat acgatactgt taaagattat 660
gcttacattc gcttctctgt atcaaacgga acaaaagctg ttaaaattgt tagttcaaca 720
cacttcaata acaaagaaga aaaatacgat tacacattaa tggaattcgc acaaccaatt 780
tataacagtg cagataaaatt caaaactgaa gaagattata agctgaaaa attattagcg 840
ccatataaaa aagcgaaaac actagaaaga caagtttatg aattaaataa aattcaagat 900
aaacttcctg aaaaattaaa ggctgagtac aagaagaaat tagaggatac aaagaaagct 960
ttagatgagc aagtgaaatc agctattact gaattccaaa atgtacaacc aacaaatgaa 1020
aaaatgactg atttacaaga tacaaaatat gttgtttatg aaagtgttga gaataacgaa 1080
tctatgatgg atacttttgt taaacaccct attaaacag gtatgcttaa cggcaaaaaa 1140
tatatggtca tggaaactac taatgacgat tactggaaag atttcatggt tgaaggtcaa 1200
cgtgttagaa ctataagcaa agatgctaaa aataatacta gaacaattat tttcccatat 1260
gttgaaggta aaactctata tgatgctatc gttaaagttc acgtaaaaac gattgattat 1320
gatggacaat accatgtcag aatcgttgat aaagaagcat ttacaaaagc caataccgat 1380
aaatctaaca aaaagaaca acaagataac tcagctaaga aggaagctac tccagctacg 1440
cctagcaaac caacaccatc acctgttgaa aaagaatcac aaaaacaaga cagccaaaaa 1500
gatgacaata acaattacc aagtgttgaa aaagaaaatg acgcatctag tgagtcaggt 1560
aaagacaaaa cgcctgctac aaaaccaact aaaggtgaag tagaatcaag tagtacaact 1620
ccaactaagg tagtatctac gactcaaaat gttgcaaaac caacaactgc ttcatcaaaa 1680
acaacaaaag atgttgttca aacttcagca ggttctagcg aagcaaaaga tagtgctcca 1740
ttacaaaaag caaacattaa aaacacaaat gatggacaca ctcaaagcca aaacaataaa 1800
aatacacaag aaaataaagc aaaatcatta ccacaaactg gtgaagaatc aaataaagat 1860
atgacattac cattaatggc attattagct ttaagtagca tcgttgcatt cgtattacct 1920
```

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agaaaacgta aaaactaa                                               1938

<210> 46
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> ORF0657nF primer

<400> 46
aaccggtttt ccatgggggaa caaacagcaa aaagaattt                        39

<210> 47
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF0657nF encoded amino acid

<400> 47
Asn Arg Phe Ser Met Gly Asn Lys Gln Gln Lys Glu
 1               5                  10


<210> 48
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> ORF0657nR primer sequence

<400> 48
gtattaccta gaaaacgtaa aaacctcgag aaaccggt                          38

<210> 49
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF0657nR encoded amino acid

<400> 49
Val Leu Pro Arg Lys Arg Lys Asn Leu Glu Lys Pro
 1               5                  10


<210> 50
<211> 16
<212> DNA
<213> Artificial Sequence
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<220>
<223> Primer

<400> 50
ctggccgtcg ttttac                                                    16

<210> 51
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 51
caggaaacag ctatgac                                                   17

<210> 52
<211> 1938
<212> DNA
<213> Artificial Sequence

<220>
<223> cDNA encoding ORF0657n protein of SEQ 3

<400> 52
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gcagctgaag aaacaggtgg tacaaataca gaagcacaac caaaaactga agcagttgca 180
agtccaacaa caacatctga aaaagctcca gaaactaaac cagtagctaa tgctgtctca 240
gtatctaata agaagttga ggctcctact tctgaaacaa aagaagctaa agaagttaaa 300
gaagttaaag cccctaagga aacaaaagaa gttaaaccag cagcaaaagc cactaacaat 360
acatatccta ttttgaatca ggaacttaga gaagcgatta aaaaccctgc aataaaagac 420
aaagatcata gcgcaccaaa ctctcgtcca attgattttg aaatgaaaaa gaaagatgga 480
actcaacagt tttatcatta tgcaagttct gttaaacctg ctagagttat tttcactgat 540
tcaaaaccag aaattgaatt aggattacaa tcaggtcaat tttggagaaa atttgaagtt 600
tatgaaggtg acaaaaagtt gccaattaaa ttagtatcat acgatactgt taaagattat 660
gcttacattc gcttctctgt atcaaacgga acaaaagctg ttaaaattgt tagttcaaca 720
cacttcaata acaaagaaga aaaatacgat tacacattaa tggaattcgc acaaccaatt 780
tataacagtg cagataaaatt caaaactgaa gaagattata agctgaaaa attattagcg 840
ccatataaaa aagcgaaaac actagaaaga caagtttatg aattaaataa aattcaagat 900
aaacttcctg aaaaattaaa ggctgagtac aagaagaaat tagaggatac aaagaaagct 960
ttagatgagc aagtgaaatc agctattact gaattccaaa atgtacaacc aacaaatgaa 1020
aaaatgactg atttacaaga tacaaaatat gttgtttatg aaagtgttga gaataacgaa 1080
tctatgatgg atactttgt taaacaccct attaaacag gtatgcttaa cggcaaaaaa 1140
tatatggtca tggaaactac taatgacgat tactggaaag atttcatggt tgaaggtcaa 1200
cgtgttagaa ctataagcaa agatgctaaa aataatacta gaacaattat tttcccatat 1260
gttgaaggta aaactctata tgatgctatc gttaaagttc acgtaaaaac gattgattat 1320
gatggacaat accatgtcag aatcgttgat aaagaagcat ttacaaaagc caataccgat 1380
aaatctaaca aaaagaaca acaagataac tcagctaaga aggaagctac tccagctacg 1440
cctagcaaac caacaccatc acctgttgaa aaagaatcac aaaaacaaga cagccaaaaa 1500
gatgacaata acaattacc aagtgttgaa aaagaaaatg acgcatctag tgagtcaggt 1560
aaagacaaaa cgcctgctac aaaaccaact aaaggtaaag tagaatcaag tagtacaact 1620
ccaactaagg tagtatctac gactcaaaat gttgcaaaac caacaactgc ttcatcaaaa 1680
acaacaaaag atgttgttca aacttcagca ggttctagcg aagcaaaaga tagtgctcca 1740
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```
ttacaaaaag caaacattaa aaacacaaat gatggacaca ctcaaagcca aaacaataaa 1800
aatacacaag aaaataaagc aaaatcatta ccacaaactg gtgaagaatc aaataaagat 1860
atgacattac cattaatggc attattagct ttaagtagca tcgttgcatt cgtattacct 1920
agaaaacgta aaaactaa                                                1938
```

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<210> 53
<211> 1938
<212> DNA
<213> Artificial Sequence
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```
<220>
<223> cDNA encoding ORF0657n protein of SEQ 4
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<400> 53
atgaacaaac agcaaaaaga atttaaatca ttttattcaa ttagaaagtc atcactaggc 60
gttgcatctg tagcgattag tacacttttta ttattaatgt caaatggcga agcacaagca 120
gcagctgaag aaacaggtgg tacaaataca gaagcacaac caaaaactga agcagttgca 180
agtccaacaa caacatctga aaaagctcca gaaactaaac cagtagctaa tgctgtctca 240
gtatctaata aagaagttga ggcccctact tctgaaacaa aagaagctaa agaagttaaa 300
gaagttaaag cccctaagga aacaaaagca gttaaaccag cagcaaaagc cactaacaat 360
acatatccta ttttgaatca ggaacttaga gaagcgatta aaaaccctgc aataaaagat 420
aaagatcata gcgcaccaaa ctctcgtcca attgattttg aaatgaaaaa agaaaatggt 480
gagcaacaat tttatcatta tgccagctct gttaaacctg ctagagttat tttcactgat 540
tcaaaaccag aaattgaatt aggattacaa tcaggtcaat tttggagaaa atttgaagtt 600
tatgaaggtg acaaaaagtt gccaattaaa ttagtatcat acgatactgt aaagattac 660
gcttacattc gcttctctgt ttcaaatgga acaaaagccg ttaaaattgt aagttcaact 720
cacttcaata acaaagaaga aaaatacgat tacacattaa tggaattcgc acaaccaatt 780
tataacagtg cagataaatt caaaactgaa gaagattata aagctgaaaa attattagcg 840
ccatataaaa aagcgaaaac actagaaaga caagtttatg aattaaataa aattcaagat 900
aaacttcctg aaaaattaaa ggctgagtac aagaagaaat tagaggatac aaagaaagct 960
ttagatgagc aagtgaaatc agctattact gaattccaaa atgtacaacc aacaaatgaa 1020
aaaatgactg atttacaaga tacaaaatat gttgtttatg aaagtgttga gaataacgaa 1080
tctatgatgg atacttttgt taaacaccct attaaaacag gtatgcttaa cggcaaaaaa 1140
tatatggtca tggaaactac taatgacgat tactggaaag atttcatggt tgaaggtcaa 1200
cgtgttagaa ctataagcaa agatgctaaa aataatacta gaacaattat tttcccatat 1260
gttgaaggta aaactctata tgatgctatc gttaaagttc acgtaaaaac gattgattat 1320
gatggacaat accatgtcag aatcgttgat aaagaagcat ttacaaaagc caataccgat 1380
aaatctaaca aaaagaaca acaagataac tcagctaaga aggaagctac tccagctacg 1440
cctagcaaac caacaccatc acctgttgaa aaagaatcac aaaaacaaga cagccaaaaa 1500
gatgacaata aacaattacc aagtgttgaa aaagaaaatg acgcatctag tgagtcaggt 1560
aaagacaaaa cgcctgctac aaaaccaact aaaggtgaag tagaatcaag tagtacaact 1620
ccaactaagg tagtatctac gactcaaaat gttgcaaaac caacaactgc ttcatcaaaa 1680
acaacaaaag atgttgttca aacttcagca ggttctagcg aagcaaaaga tagtgctcca 1740
ttacaaaaag caaacattaa aaacacaaat gatggacaca ctcaaagcca aaacaataaa 1800
aatacacaag aaaataaagc aaaatcatta ccacaaactg gtgaagaatc aaataaagat 1860
atgacattac cattaatggc attactagct ttaagtagca tcgttgcatt cgtattacct 1920
agaaaacgta aaaactaa                                                1938
```

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<210> 54
<211> 1935
<212> DNA
<213> Artificial Sequence
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<220>
<223> cDNA encoding ORF0657n protein of SEQ 5
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<400> 54
atgaacaaac agcaaaaaga atttaaatca ttttattcaa ttagaaagtc atcactaggc 60
gttgcatctg tagcgattag tacactttta ttattaatgt caaatggcga agcacaagca 120
gctgaagaaa caggtggtac aaatacagaa gcacaaccaa aaactgaagc agttgcaagt 180
ccaacaacaa catctgaaaa agctccagaa actaaaccag tagctaatgc tgtctcagta 240
tctaataaag aagttgaggc ccctacttct gaaacaaaag aagctaaaga agttaaagaa 300
gttaaagccc ctaaggaaac aaaagcagtt aaaccagcaa caaaagccga taacaataca 360
tatcctattt tgaatcagga acttagagaa gcgattaaaa accctgcaat aaaagataaa 420
gatcatagcg caccaaactc tcgtccaatt gattttgaaa tgaaaaaaga aaatggtgag 480
caacaatttt atcattatgc cagctctgtt aaacctgcta gagttatttt cactgattca 540
aaaccagaaa ttgaattagg attacaatca ggtcaatttt ggagaaaatt tgaagtttat 600
gagggtgaca aaaagttgcc aattaaatta gtatcatacg atactgttaa agattatgct 660
tacattcgtt tctctgtatc aaatggaaca aaagctgtta aaattgttag ttcaacacac 720
ttcaataaca aagaagaaaa atacgattac acattaatgg aattcgcaca accaatttat 780
aacagtgcag ataaattcaa aactgaagaa gattataaag ctgaaaaatt attagcgcca 840
tataaaaaag cgaaaacact agaaagacaa gtttatgaat taaataaaat tcaagataaa 900
cttcctgaaa aattaaaggc tgagtacaag aagaaattag aggatacaaa gaaagcttta 960
gatgagcaag tgaaatcagc tattactgaa ttccaaaatg tacaaccaac aaatgaaaaa 1020
atgactgatt tacaagatac aaaatatgtt gtttatgaaa gtgttgagaa taacgaatct 1080
atgatggata ctttttgttaa acaccctatt aaaacaggta tgcttaacgg caaaaaatat 1140
atggtcatgg aaactactaa tgacgattac tggaaagatt tcatggttga aggtcaacgt 1200
gttagaacta taagcaaaga tgctaaaaat aatactagaa caattatttt cccatatgtt 1260
gaaggtaaaa ctctatatga tgctatcgtt aaagttcacg taaaaacgat tgattatgat 1320
ggacaatacc atgtcagaat cgttgataaa gaagcattta caaaagccaa taccgataaa 1380
tctaacaaaa aagaacaaca agataactca gctaagaggg aagctactcc agctacgcct 1440
agcaaaccaa caccatcacc tgttgaaaaa gaatcacaaa aacaagacag ccaaaaagat 1500
gacaataaac aattaccaag tgttgaaaaa gaaatgacg catctagtga gtcaggtaaa 1560
gacaaaacgc ctgctacaaa accagctaaa ggtgaagtag aatcaagtag tacaactcca 1620
actaaggtag tatctacgac tcaaaatgtt gcaaaccaa caactgcttc atcaaaaaca 1680
acaaaagatg ttgttcaaac ttcagcaggt tctagcgaag caaaagatag tgctccatta 1740
caaaaagcaa acattaaaaa cacaaatgat ggacacactc aaagccaaaa caataaaaat 1800
acacaagaaa ataaagcaaa atcattacca caaactggtg aagaatcaaa taaagatatg 1860
acattaccat taatggcatt attagcttta agtagcatcg ttgcattcgt attacctaga 1920
aaacgtaaaa actaa 1935

<210> 55
<211> 1935
<212> DNA
<213> Artificial Sequence

<220>
<223> cDNA encoding ORF0657n protein of SEQ 6

<400> 55
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gttgcatctg tagcgattag tacactttta ttattaatgt caaatggcga agcacaagca 120
gctgaagaaa caggtggtac aaatacagaa gcacaaccaa aaactgaagc agttgcaagt 180
ccaacaacaa catctgaaaa agctccagaa actaaaccag tagctaatgc tgtctcagta 240
tctaataaag aagttgaggc ccctacttct gaaacaaaag aagctaaaga agttaaagaa 300
gttaaagccc ctaaggaaac aaaagcagtt aaaccagcaa caaaagccga taacaataca 360
tatcctattt tgaatcagga acttagagaa gcgattaaaa accctgcaat aaaagataaa 420
gatcatagcg caccaaactc tcgtccaatt gattttgaaa tgaaaaaaga aaatggtgag 480
caacaatttt atcattatgc cagctctgtt aaacctgcta gagttatttt cactgattca 540
aaaccagaaa ttgaattagg attacaatca ggtcaatttt ggagaaaatt tgaagtttat 600

- 81 -

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gagggtgaca aaaagttgcc aattaaatta gtatcatacg atactgttaa agattatgct 660
tacattcgtt tctctgtatc aaatggaaca aaagctgtta aaattgttag ttcaacacac 720
ttcaataaca aagaagaaaa atacgattac acattaatgg aattcgcaca accaatttat 780
aacagtgcag ataaattcaa aactgaagaa gattataaag ctgaaaaatt attagcgcca 840
tataaaaaag cgaaaacact agaaagacaa gtttatgaat taaataaaat tcaagataaa 900
cttcctgaaa aattaaaggc tgagtacaag aagaaattag aggatacaaa gaaagcttta 960
gatgagcaag tgaaatcagc tattactgaa ttccaaaatg tacaaccaac aaatgaaaaa 1020
atgactgatt tgcaagatac aaaatatgtt gtttatgaaa gtgttgagaa taacgaatct 1080
atgatggata cttttgttaa acaccctatt aaaacaggta tgcttaacgg caaaaaatat 1140
atggtcatgg aaactactaa tgacgattac tggaaagatt tcatggttga aggtcaacgt 1200
gttagaacta taagcaaaga tgctaaaaat aatactagaa caattatttt cccatatgtt 1260
gaaggtaaaa ctctatatga tgctatcgtt aaagttcacg taaaaacgat tgattatgat 1320
ggacaatacc atgtcagaat cgttgataaa gaagcatttta caaaagccaa taccgataaa 1380
tctaacaaaa aagaacaaca agataactca gctaagaagg aagctactcc agctacgcct 1440
agcaaaccaa caccatcacc tgttgaaaaa gaatcacaaa aacaagacag ccaaaaagat 1500
gacaataaac aattaccaag tgttgaaaaa gaaaatgacg catctagtga gtcaggtaaa 1560
gacaaaacgc ctgctacaaa accagctaaa ggtgaagtag aatcaagtag tacaactcca 1620
actaaggtag tatctacgac tcaaaatgtt gcaaaccaa caactgcttc atcaaaaaca 1680
acaaaagatg ttgttcaaac ttcagcaggt tctagcgaag caaaagatag tgctccatta 1740
caaaaagcaa acattaaaaa cacaaatgat ggacacactc aaagccaaaa caataaaaat 1800
acacaagaaa ataaagcaaa atcattacca caaactggtg aagaatcaaa taaagatatg 1860
acattaccat taatggcatt attagcttta agtagcatcg ttgcattcgt attacctaga 1920
aaacgtaaaa actaa                                               1935
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<210> 56
<211> 1934
<212> DNA
<213> Artificial Sequence

<220>
<223> cDNA encoding ORF0657n protein of SEQ 7

<400> 56
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gctgaagaaa caggtggtac aattacagaa acacaaccaa aaactgaagc agttgcaagt 180
ccaacaacaa caactgaaaa agctccagaa gctaaaccag tagctaatgc tgtctccgta 240
tctaataaag aagttgtggc ccctactact gaaacaaaag aagctaaaga agttaaagaa 300
gttaaagccc ctaatgaaac aaaagaagtt aaaccagcag caaatccga taacaataca 360
tatcctattt tgaatgagga acttagagaa gcgattaaaa acccagcaat aaaagataaa 420
gatcatagcg caccaaactc tcgtccaatt gattttgaaa tgaaaaagaa agatggcact 480
caacagtttt atcattatgc aagttctgtt aaacctgcta gagttatttt cactgattca 540
aaaccagaaa ttgaattagg attacaatca ggtcaatttt ggagaaaatt tgaagtttat 600
gaaggtgaca aaaaattacc aatcaaatta gtatcatatg atactgttaa agactatgct 660
tacattcgct tctctgtttc aaatggaaca aaagcagtta aaatcgtaag ttcaactcac 720
ttcaataata aagaagaaaa atatgattac acgttaatgg aattcgcgca accgatttat 780
aacagtgcag ataaattcaa aactgaagaa gattacaaag ctgaaaaatt attagcgcca 840
tataaaaaag cgaaaacact agaaagacaa gtttatgaat taaataaaat tcaagataaa 900
cttcccgaaa aattgaaagc tgaatacaag aagaaattag aagagactaa aaaagcttta 960
gatgaacaag tgaaatccgc aataactgaa ttccaaaatg tacaaccaac aaatgaaaaa 1020
atgactgatt tacaagatac aaaatatgtt gtttatgaaa gtgttgagaa taacgaatct 1080
atgatggata cttttgttaa acaccctatt aaaacaggta tgcttaacgg caaaaaatat 1140
atggtaatgg aaactactaa tgacgattac tggaaagatt tcatggttga aggtgaacgt 1200
gttagaacaa ttagcaaaga tgctaaaaat aacactagaa cgattatttt cccatatgtt 1260
gaaggtaaaa ccctatatga tgctatcgtt aaagttcacg taaaaacgat tgattatgat 1320
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ggacaatacc atgtcagaat cgttgataaa gaagcattta ctaaagccaa tgccgataaa 1380
tctaataaaa aggaacaaca agacaactca gctaagaagg aagctacacc agctacgcct 1440
agcaaaccaa caacagcacc tgttgaaaaa gaatcacaaa acaagacagc caaaaagatg 1500
acaataaaca atcaccaagt gttgaaaaag aaattgatgc atctagtgag tcaggtaaag 1560
acaaaacgcc tgctacaaaa ccagctaaag gtgaagtaga atcaagtagt acaactccaa 1620
ctaaggtagt atctgcgact caaaatgttg caaaacctac atctgcttct tcagaaacaa 1680
caaaaggtgt tgttcaaact tcagcaggtt ctagcgaagc aaaagataat gctccattac 1740
aaaaagcaaa cattaaaaac acaaatgatg gacatactca aagccaaaac aataaaaata 1800
cacaagaaaa taaagctaaa tcattaccac aaactggtga agaatcgaat aaagatatga 1860
cattaccatt aatggcatta ttagctttaa gcagcatcat tgcattcgta ttacctagaa 1920
aacgtaaaaa ctaa                                                   1934
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<210> 57
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> cell wall sorting signal

<220>
<221> SITE
<222> 3
<223> Xaa = any amino acid

<400> 57
Leu Pro Xaa Thr Gly Val Ile
 1               5


<210> 58
<211> 324
<212> PRT
<213> Artificial Sequence

<220>
<223> hybrid sequence


<220>
<221> SITE
<222> 1
<223> glutamic acid or aspartic acid

<220>
<221> SITE
<222> 9
<223> lysine or isoleucine

<220>
<221> SITE
<222> 12
<223> aspartic acid or glutamic acid
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<220>
<221> SITE
<222> 14
<223> serine or threonine


<220>
<221> SITE
<222> 18
<223> serine or tryptophan


<220>
<221> SITE
<222> 27
<223> lysine or asparagine


<220>
<221> SITE
<222> 28
<223> lysine or aspartic acid


<220>
<221> SITE
<222> 29
<223> aspartic acid or lysine


<220>
<221> SITE
<222> 31
<223> threonine or glutamic acid


<220>
<221> SITE
<222> 40
<223> serine or threonine


<220>
<221> SITE
<222> 42
<223> lysine or glutamic acid


<220>
<221> SITE
<222> 50
<223> aspartic acid or lysine
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<220>
<221> SITE
<222> 51
<223> serine or threonine


<220>
<221> SITE
<222> 53
<223> glutamic acid or isoleucine


<220>
<221> SITE
<222> 60
<223> serine or threonine


<220>
<221> SITE
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<223> glycine or alanine


<220>
<221> SITE
<222> 62
<223> lysine or serine


<220>
<221> SITE
<222> 63
<223> phenylalanine or threonine


<220>
<221> SITE
<222> 65
<223> arginine or lysine

<220>
<221> SITE
<222> 78
<223> isoleucine or valine


<220>
<221> SITE
<222> 85
<223> threonine or serine
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<220>
<221> SITE
<222> 86
<223> valine or aspartic acid


<220>
<221> SITE
<222> 101
<223> lysine or arginine


<220>
<221> SITE
<222> 102
<223> alanine or glutamic acid


<220>
<221> SITE
<222> 111
<223> phenylalanine or tyrosine


<220>
<221> SITE
<222> 112
<223> is an optionally present glycine insertion


<220>
<221> SITE
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Gln Phe Tyr His Tyr Ala Ser Xaa Val Xaa Pro Ala Arg Val Ile Phe
            35                  40                  45
Thr Xaa Xaa Lys Xaa Ile Glu Leu Gly Leu Gln Xaa Xaa Xaa Xaa Trp
    50                  55                  60
Xaa Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro Xaa Lys Leu
65                  70                  75                  80
Val Ser Tyr Asp Xaa Xaa Lys Asp Tyr Ala Tyr Ile Arg Phe Ser Val
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Ser Asn Gly Thr Xaa Xaa Val Lys Ile Val Ser Ser Thr His Xaa Xaa
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Xaa Asn Xaa Xaa Glu Lys Tyr Asp Tyr Thr Leu Met Xaa Phe Ala Gln
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Pro Ile Tyr Asn Xaa Xaa Asp Lys Xaa Xaa Xaa Glu Glu Asp Tyr Xaa
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Gln Val Tyr Glu Leu Xaa Lys Xaa Gln Xaa Lys Leu Pro Glu Lys Leu
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Arg Thr Xaa Ser Lys Asp Xaa Lys Asn Asn Xaa Arg Thr Xaa Ile Phe
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Pro Tyr Xaa Glu Gly Lys Xaa Xaa Tyr Asp Ala Ile Val Lys Val Xaa
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Lys Xaa Xaa Xaa
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